REMARKS

This is a full and timely response to the non-final Office Action of March 3, 2005.

Reexamination, reconsideration, and allowance of the application and all presently pending

claims are respectfully requested.

Upon entry of this paper, claims 1, 4-10, and 21-33 are pending in this application.

Claims 1, 4, 10, and 21-26 are directly amended herein, and claims 27-33 are newly added. It is

believed that the foregoing amendments add no new matter to the present application.

Response to Claim Objections

Claims 22-26 presently stand objected to in the outstanding Office Action as depending

upon previously canceled claims. In compliance with requirements set forth in the Office

Action, claims 22-26 have been amended herein, and Applicants request that the objections to

these claims be withdrawn.

Response to §103 Rejections

In order for a claim to be properly rejected under 35 U.S.C. §103, the combined

teachings of the prior art references must suggest all features of the claimed invention to one of

ordinary skill in the art. See, *e.g.*, *In Re Dow Chemical Co.*, 837 F.2d 469, 5 U.S.P.Q.2d 1529,

1531 (Fed. Cir. 1988), and *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981).

In addition, "(t)he PTO has the burden under section 103 to establish a *prima facie* case of

obviousness." *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

Claim 1

Claim 1 presently stands rejected under 35 U.S.C. §103 as purportedly being unpatentable over *Greene* (U.S. Patent No. 5,579,455) in view of *Greene* (U.S. Patent No. 6,646,639). Claim 1 presently reads as follows:

> 1. A multi-function unit of a graphics system, comprising:
> a hierarchical tiler configured to occlusion test primitives, the primitives comprising a maximum Z value and a minimum Z value, the maximum and minimum Z values associated with respective X-Y coordinate values, the hierarchical tiler further configured to create a Z pyramid data structure as polygons defined by a plurality of primitives are processed by the multi-function unit;
> a parameter interpolator coupled to the hierarchical tiler configured to receive the X-Y coordinate values from the hierarchical tiler and generate a Z value at the pixel level for each received X-Y coordinate value;
> a pixel-level comparator coupled to the parameter interpolator configured to determine at a pixel level which values need to be written by a frame buffer controller; and
> a memory unit coupled to the hierarchical tiler and the pixel-level comparator, *the memory unit configured to store a change in the Z pyramid data structure responsive to an occlusion test result for a visible primitive before the pixel-level comparator determines whether pixel level values for the visible primitive need to be written by the frame buffer controller*. (Emphasis added).

Applicants respectfully assert that the cited art fails to suggest or teach at least the features of pending claim 1 highlighted hereinabove. Accordingly, the 35 U.S.C. §103 rejection of claim 1 is improper.

In this regard, both U.S. Patent No. 5,579,455 ("the '455 patent") and U.S. Patent No. 6,46,639 ("the '639 patent") describe a graphical display system that uses a Z pyramid data structure to cull hidden primitives. However, neither reference suggests a system or a method capable of updating the Z pyramid data structure for a visible primitive before a "pixel-level comparator determines whether pixel values for the visible primitive need to be written by the frame buffer controller," as recited by claim 1. In particular, a "pixel-level comparator"

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normally determines whether pixel values from a primitive need to be written by a frame buffer controller once the primitive has been scan converted to provide the Z values for the pixels, and the '455 patent specifically teaches that a Z pyramid data structure is to be updated for a particular primitive *after* the primitive has been scan converted. See blocks 2006 and 2020 of Figure 20. Further, the '639 patent fails to remedy the foregoing deficiency of the '455 patent.

In addition, Applicants observe that the filing date of the '639 patent is subsequent to the filing date of the instant application. The '639 patent is a continuation-in-part of U.S. Patent Application 09/585,810, and this application is a continuation-in-part of U.S. Patent Application 09/121,317, which is the only application in the chain filed before the filing date of the instant application. Since new matter may be introduced by continuation-in-part applications, it is incumbent upon the Patent Office to establish that the subject matter from the '639 patent used to reject the claims of the instant application is supported by the disclosure of both U.S. Patent Application No. 09/585,810 and U.S. Patent Application No. 09/121,317. See M.P.E.P. §706.02 (f)(1). Applicants respectfully assert that the Office Action fails to make such a showing and, therefore, fails to establish a *prima facie* case of obviousness with respect to claim 1.

For at least the above reasons, Applicants respectfully assert that the cited art fails to teach each feature of pending claim 1. Accordingly, the 35 U.S.C. §103 rejection of claim 1 should be withdrawn.

Claims 4-10 and 21-28

Claims 4-10 and 21-26 presently stand rejected in the Office Action under 35 U.S.C. §103 as allegedly being unpatentable over the '455 patent in view of the '639 patent. Further, claims 27 and 28 have been newly added via the amendments set forth herein. Applicants submit that the pending dependent claims 4-10 and 21-28 contain all features of their respective independent claim 1. Since claim 1 should be allowed, as argued hereinabove, pending dependent claims 4-10 and 21-28 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Furthermore, these dependent claims recite patentably distinct features and/or combinations of features that make them allowable, notwithstanding the allowability of their base claim 1.

For example, claim 23 recites "wherein when the hierarchical tiler determines that the *maximum Z value of the visible primitive* is less than the Z value for a covered subregion, a bit in the coverage mask associated with the covered subregion is set." (Emphasis added). It is asserted in the Office Action that the foregoing features of claim 23 are suggested by the '455 patent at column 17, lines 26-32. However, such a section of the '455 patent teaches that a Z value of a pyramid data structure is compared to the "nearest depth of the primitive." The "nearest depth of the primitive" represents a *minimum* Z value for the primitive, not a "maximum" Z value for the primitive, as recited by claim 23. Accordingly, the Office Action fails to establish that the cited art suggests each feature of claim 23, and the 35 U.S.C. §103 rejection of claim 23 should be withdrawn, notwithstanding the allowability of independent claim 1.

Claim 29

Claim 29 has been newly added via the amendments set forth herein. Claim 29 presently

reads as follows:

> 29. A method for use in a graphics system, comprising:
> defining a Z pyramid data structure;
> comparing a minimum Z value of a primitive to the Z pyramid data structure;
> determining whether the primitive is occluded based on the comparing;
> scan converting the primitive to a pixel level if the primitive is determined to be not fully occluded in the determining; and
> updating the Z pyramid based on the primitive prior to the scan converting.

Applicants submit that the cited art fails to disclose or suggest each of the above features of

claim 29. Accordingly, claim 29 is allowable.

Claims 30-33

Claims 30-33 have been newly added via the amendments set forth herein. Applicants

submit that the pending dependent claims 30-33 contain all features of their respective

independent claim 29. Since claim 29 should be allowed, as argued hereinabove, pending

dependent claims 30-33 should be allowed as a matter of law for at least this reason. *In re Fine*,
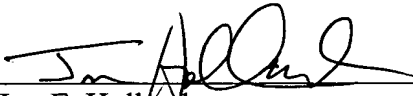
5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

CONCLUSION

Applicants respectfully request that all outstanding objections and rejections be withdrawn and that this application and all presently pending claims be allowed to issue. If the Examiner has any questions or comments regarding Applicants' response, the Examiner is encouraged to telephone Applicants' undersigned counsel.

Respectfully submitted,

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.P.

By: _____
Jon E. Holland
Reg. No. 41,077
(256) 704-3900 Ext. 103

Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400